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IDEA-0207-68
Copy 8 of 10

1 April 1968

MEMORANDUM FOR THE RECORD

SUBJECT : U-2R Discussions with LAC, 26-28 March

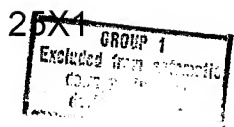
1. On 26 March [redacted] and the undersigned visited Edwards AFB to review the ejector noise and vibration problem status with [redacted] LAC. It was evident that LAC was no nearer to a solution to the problem than when the problem first occurred, approximately one month ago. Approximately 18-20 different ejector/tailpipe configurations have been tested on Aircraft #1 alone without satisfactory results. The problem appears to be one of over-sensitivity of the augmentor to minute differences so that what may work satisfactorily on one aircraft is unacceptable when transferred to another aircraft. We witnessed the ground run of Aircraft #4 with the bill of material configuration, and the vibration was completely unacceptable. Since the initial tests of Aircraft #1 did not experience this problem, one can only conclude, as suggested above, that minor configuration differences are inducing the disturbances and that after running time has accrued on Aircraft #1, it is now similar in configuration to Aircraft #4.

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2. On 27 March the above individuals and [redacted] met with [redacted] to further review the problem. We were advised that subsequent to our departure from Edwards AFB on 26 March, Aircraft #4 was ground tested with a 15" cylindrical tailpipe extension and the vibration was again unacceptable. We reviewed the latest change to Aircraft #1 which was to remove six inches from the aft end of the fuselage and increase the ejector diffusion angle to 12° which is estimated to be the exhaust gas diffusion angle of the U-2C, although the U-2C does not have a diffused ejector. Since the basic problem appears to be one of overexpansion of the exhaust gas due to insufficient ejector air, Headquarters expressed apprehension as to the logic of this modification which would appear to result in further overexpansion.

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3. Headquarters suggested that a more direct attack on the problem would be one which focused on increasing the quantity of ejector air. To this end, the following specific suggestions were offered:

A. Add suck-in doors aft of the main Titanium fuselage ring since this ring appeared to present a possible restriction to the secondary airflow.

B. Seal off the engine face by-pass and get the secondary air from access doors downstream. Indications are that the engine may be robbing the ejector air due to reverse flow on the ground.

C. Open the minimum ejector annulus area by cutting off the exhaust nozzle in one inch increments. The possibility exists that, under hot conditions, after the tailpipe has expanded three inches in length, this annulus may be too small to allow proper passage of secondary air.

D. Use the scratch pad technique to measure the tailpipe extension with engine RPM for each aircraft and determine the differences between aircraft. Each aircraft may have a different expansion characteristic accounting for the fact that various modifications perform differently on various aircraft.

4. Headquarters raised the point of actual flight demonstrations of the ranges and altitudes in the U-2R Model Specification. It was pointed out that since the zero fuel weight (ZFW) of the number one aircraft was approximately 1000 pounds heavier than the operational configuration due to flight test instrumentation, it would be impossible to use this aircraft to demonstrate the ranges and the final altitude of the model spec. This demonstration will have to be performed by one of the operational aircraft. Also the results will be dependent upon the atmospheric environment and may require corrections to standard day conditions.

5. [] reviewed the new format to be used for presenting the handbook performance data: It was suggested that before LAC proceeded to forward this revised format,

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representatives of D/O, D/M and D/R&D plus [REDACTED], AF, meet with LAC to review and approve the format.

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6. On 28 March the above Headquarters personnel reconvened with Kelly Johnson and his staff to review the status of the U-2R flight test program and also to review specific test results. Before discussing this subject, however, Kelly reviewed once again the ejector/vibration problem and the various fixes already investigated and those to be investigated. Nothing that hadn't already been discussed the previous day came out of this briefing. With reference to the status of the flight test program, no estimated end date could be given until the vibration problem is solved. We were told that the maximum altitude performance buffet results and stability and control results have been as estimated, however, copies of the data are being sent to D/R&D for review. Kelly was surprised to learn that the flight structural demonstration (V-G diagram) had not yet been performed. His comment was that this should have been done before the first aircraft was delivered. Test results of the aircraft cooling characteristics were presented. PSD/OSA has a copy.

7. It was learned that the tail flutter problem was in fact the result of a design deficiency rather than due to the missing washer as previously reported. The new stiffened tail section should correct the problem.

SIGNED

[REDACTED]
ASD/R&D/OSA

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